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| EXAMINER |
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VINH, LAN

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| ART UNIT | PAPER NUMBER |
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1765

DATE MAILED: 07/13/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/604,196

Applicant(s)

DOKUMACI ET AL.

Examiner

Lan Vinh

Art Unit

1765

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 May 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 18 and 19 is/are allowed.
- 6) ☒ Claim(s) 1-4 and 6-16 is/are rejected.
- 7) ☒ Claim(s) 5 and 17 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

1. Applicant's arguments, see page 7 of the response, filed 5/17/2005, with respect to the rejection(s) of claims 1-3, 6-13 under 35 USC 102(e) have been fully considered and are persuasive. The rejection has been withdrawn. However, upon further consideration, a new ground of rejection under 35 USC 103(a) is made in view of Cherian et al (US 6,841,479). A discussion of the rejection follows.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-4, 6-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al (US 6,683,340) in view of Cherian et al (US 6,841,479)

Kim discloses a method for forming a memory device. The method comprises the steps of:

providing a device/article comprises a substrate 200 and one structure formed on the substrate (fig. 6E)

forming a first layer/first material 214 over the device/article (col 7, lines 56-57; fig. 6F)

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forming a second nitride layer/second material 215 over the first layer 214 (col 7, lines 66-67)

removing a portion of layer 215/second material layer using a CMP (chemical mechanical polishing) (col 7, line 67, fig. 6 H)

removing a portion of layer 214/first material (col 8, lines 16-18; fig. 6K)

Unlike the instant claimed invention as per claim 1, Kim fails to specifically disclose using a polishing pad and a liquid to remove a portion of the second material although Kim discloses that the removal step is performed by CMP

Cherian discloses a method of reducing in-trench smearing during polishing comprises the step of polishing a layer using a polishing pad and a slurry/liquid in a CMP process (col 5, lines 5-10)

Since Kim discloses removing a portion of layer 215/second material layer using a CMP process, one skilled in the art at the time the invention was made would have found it obvious to modify Kim by using a polishing pad and a liquid in the CMP process because Cherian discloses that an accepted method for polishing semiconductor device comprises polishing the surface of the semiconductor device with a polishing composition and a polishing pad, such as is accomplished by CMP (col 5, lines 5-12)

Regarding claims 2, 7, nitride is known in the art as a hard material (see prior art of record for evidence of this basis)

Unlike the instant claimed inventions as per claims 4, Kim fails to specifically disclose that the polishing pad comprises abrasives

Cherian also discloses polishing using a polishing pad comprises abrasives (col 5, lines 57-58)

Hence, one skilled in the art at the time the invention was made would have found it obvious to modify Kim's CMP polishing step by using polishing pad comprises abrasives as per Cherian because Cherian discloses that any suitable amount of abrasives can be embedded in the pad to provide for polishing of a substrate at a suitable rate without introducing unduly deleterious scratches or other imperfections in the substrate surface (col 5, lines 58-67)

Regarding claim 6, Kim discloses removing a portion of layer 215/second material forming a substantially planar surface from the layer 215/second material (fig. 6H)

Regarding claim 8, Kim discloses removing additional portion of layer 215/second material (col 8, lines 12-14; fig. 6J)

Regarding claim 9, Kim discloses forming a planar surface of the layer 214/first material (fig. 6K)

Regarding claim 10, fig. 6J of Kim shows that all of the layer 215/second material is removed from the layer 214/first material

Regarding claims 11-12, Kim discloses using wet-etching/nonselective etching to remove portion of layer 214 and 215 (col 7, lines 66-67; col 8, lines 12-15)

Regarding claim 13, Fig. 6K of Kim shows that more of layer 214/first material is removed in an etching step

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4. Claims 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al (US 6,683,340) in view of Cherian et al (US 6,841,479)

Kim discloses a method for forming a memory device. The method comprises the steps of:

providing a device/article comprises a substrate 200 and one structure formed on the substrate (fig. 6E), fig. 6F shows the device having a non-planar topography

forming a first layer/first material 214 over the device/article (col 7, lines 56-57; fig. 6F)

forming a second nitride layer/second material 215 over the first layer 214 (col 7, lines 66-67), nitride is known in the art as a hard material (see prior art of record for evidence of this basis)

removing a portion of layer 215/second material layer using a CMP (chemical mechanical polishing) (col 7, line 67, fig. 6 H). Kim also discloses removing a portion of layer 215/second material forming a substantially planar surface of layer 215/second material (fig. 6H)

using wet-etching/nonselective etching to remove portion of layer 214 and 215 (col 7, lines 66-67; col 8, lines 12-15), forming a planar surface of the layer 214/first material (fig. 6K), fig. 6J of Kim shows that all of the layer 215/second material is removed from the layer 214/first material

more of layer 214/first material is removed in an etching step (fig. 6K)

Unlike the instant claimed inventions as per claim 14-15, Kim fails to specifically disclose using a polishing pad and a liquid/slurry to remove a portion of the second material although Kim discloses that the removal is performed by CMP

Cherian discloses a method of reducing in-trench smearing during polishing comprises the step of polishing a layer using a polishing pad and a slurry/liquid in a CMP process (col 5, lines 5-10)

Since Kim discloses removing a portion of layer 215/second material layer using a CMP process, one skilled in the art at the time the invention was made would have found it obvious to modify Kim by using a polishing pad and a liquid in the CMP process because Cherian discloses that an accepted method for polishing semiconductor device comprises polishing the surface of the semiconductor device with a polishing composition and a polishing pad, such as is accomplished by CMP (col 5, lines 5-12)

Unlike the instant claimed inventions as per claims 16, Kim fails to specifically disclose that the polishing pad comprises abrasives

Cherian also discloses polishing using a polishing pad comprises abrasives (col 5, lines 57-58)

Hence, one skilled in the art at the time the invention was made would have found it obvious to modify Kim's CMP polishing step by using polishing pad comprises abrasives as per Cherian because Cherian discloses that any suitable amount of abrasives can be embedded in the pad to provide for polishing of a substrate at a suitable rate without introducing unduly deleterious scratches or other imperfections in the substrate surface (col 5, lines 58-67)

Allowable Subject Matter

5. Claims 5, 17 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 18-19 allowed.

The following is a statement of reasons for the indication of allowable subject matter/reasons for allowance :

Regarding claims 5, 17, 18, 19, the cited prior art of record, taken alone or in combination, fails to disclose a method for planarizing comprises the step of removing a portion of the second material wherein none of the first material is removed, in combination with the rest of the limitations of claims 5, 17, 18, 19. In the contrary, the closest cited prior art of Kim et al (US 6,683,340) discloses a method for forming a memory device comprises the step of removing a portion of the second layer 215/second material while removing a portion of the first layer 214/first material (fig. 6H)

Response to Arguments

6. Applicants argue that Kim discloses a conductive layer 214 and nitride layer 215 that do not correspond to "a first material over the article" and "a second material over the first material". This argument is unpersuasive because as clearly shown in fig. 6E-6G of Kim, a first layer/first material 214 is formed over the device comprises a substrate and one structure/claimed article (col 7, lines 56-57; fig. 6F), a second nitride layer/second

material 215 is formed over the first layer 214 (col 7, lines 66-67). Thus, the examiner still relies on Kim as a primary reference.

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Chen et al (US 6,753,249) discloses forming a hard layer such as a nitride layer (col 4, lines 24-26)

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lan Vinh whose telephone number is 571 272 1471. The examiner can normally be reached on M-F 8:30-5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on 571 272 1465. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only.



LV
July 11, 2005